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Comparative Operating Costs for Advanced Manufacturing

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1.0 EXECUTIVE SUMMARY

Applied Economics was retained by the City of Yuma to prepare a comparative operating cost analysis for a 100-employee advanced manufacturing facility. The analysis compares a location in Yuma, Arizona to alternative locations in El Cajon, California and San Bernardino California and estimates overall operating costs in each location over a 10 year period on the basis of wages, benefits, real estate, taxes and utilities. A map of Yuma and the comparative locations is included at the end of the report.

Project Description

- The company would have 100 non-exempt employees working a single shift and they would employ a mix of assemblers, machine operators and setters, welders, inspectors and other production workers (**Figure 1**). Occupational wages vary by location.

- They would build an 80,000 square foot facility on 12 acres, and purchase $7.5 million of manufacturing equipment. The cost of land and construction vary by location.

- Electricity usage is estimated at 150,000 kWh per month with a 65 percent load factor. Electric rates reflect current tariffs for the primary electric provider in each location.

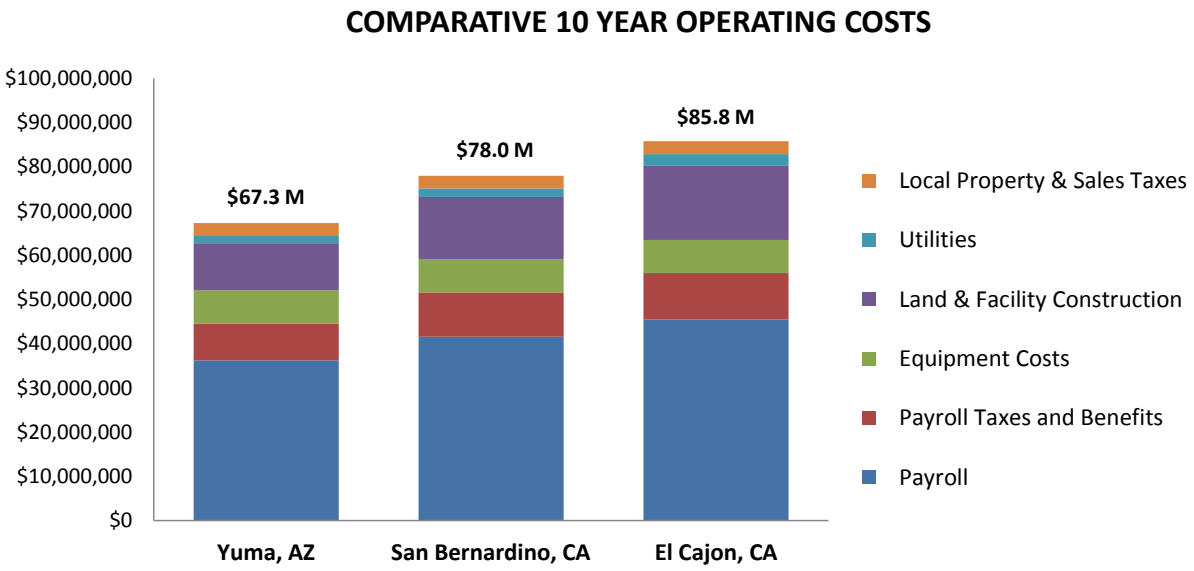
FIGURE 1
ADVANCED MANUFACTURING PRO-FORMA

Labor and Payroll	
Total Employees	100
Annual Payroll	
Yuma, AZ	$3,625,683
El Cajon, CA	$4,548,999
San Bernardino, CA	$4,158,363
Capital Expenditures	
Manufacturing Equipment	$7,500,000
Land and Building Cost (80,000 SF on 12 acres)	
Yuma, AZ	$1,066,965
El Cajon, CA	$1,675,264
San Bernardino, CA	$1,408,533
Utilities	
Electricity (65% Load Factor)	150,000 KWh per month/320 KW demand

Summary of Results

- Total operating costs are 16 percent to 28 percent lower in Yuma compared to Southern California at $67.3 million over 10 years, compared to $78.0 million in San Bernardino and $85.8 million in El Cajon.

- The most significant difference between the three locations on a percentage basis is land and construction costs. The land and construction costs in the Southern California locations are $3.1 million to $5.6 million higher than those in Yuma based on the pro-forma in this analysis.



- Wages also vary considerably by location. Based on prevailing industry wages for typical occupations in advanced manufacturing, annual payroll costs are estimated at $3.6 million in Yuma versus $4.2 million per year in San Bernardino and $4.5 million per year in El Cajon. This is significant because wages make up about half of total operating costs.

- Finally, there are significant differences in electricity costs between the locations. Electric costs are 18 percent higher in San Bernardino and 62 percent higher in El Cajon, resulting in a difference of $300,000 to $1.0 million over ten years compared to Yuma.

2.0 COMPARATIVE OPERATING COST FACTORS

Land and Construction

This analysis assumes that the company would purchase 12 acres and build an 80,000 square foot concrete tilt-up building. Land costs were obtained from listings data for industrial land in each location. An average cost per acre was computed based on the available comparable properties. Industrial land costs are significantly higher in El Cajon at $380,000 per acre and at $178,000 per acre in San Bernardino, compared to $100,000 per acre in Yuma (**Figure 2**).

Construction costs are based on the 2019 average cost per square foot for a single-story manufacturing facility from R.S. Means, adjusted by the city cost index for each location. Construction costs for an 80,000 square foot building are estimated at $8.6 million in Yuma, versus $10.8 million to $10.9 million in San Bernardino and El Cajon. Note that the total annual cost listed for each city in Figure 2 represents the estimated annual loan payment on a 10-year commercial loan at 6 percent interest with a 20 percent down payment.

FIGURE 2
REAL ESTATE COSTS

Assumptions: 80,000 SF manufacturing facility on a 12 acre parcel. Construction costs of $124.80 per square foot, adjusted for local labor and materials cost index.	
Yuma, AZ	
Land	$1,200,000
Building	$8,616,192
Total Annual Cost[1]	$1,066,965
El Cajon, CA	
Land	$4,560,000
Building	$10,852,608
Total Annual Cost[1]	$1,675,264
San Bernardino, CA	
Land	$2,136,000
Building	$10,822,656
Total Annual Cost[1]	$1,408,533

Sources: Loopnet industrial land listings, May 2019; R.S. Means 2019 Building Construction Cost and Square Foot Cost Data.

[1] Total annual cost for new construction represents the annual payment on a commercial real estate loan for 10 years, at 6 percent interest, on 80 percent of the land and building cost.

Payroll and Benefits

The manufacturer in this comparison would employ 100 people. Payroll estimates are based on occupational wages for 13 occupations that are representative of the workforce mix for advanced manufacturing. Key occupations include team assemblers, electronic assemblers, various machine setters, inspectors, laborers, machinists, welders, supervisors, engineers and shipping clerks. In total, wages in Yuma are about 20 percent lower than those in El Cajon and 13 percent lower than San Bernardino. The most significant differences are for production supervisors, team assemblers and inspectors. Annual payroll is estimated at $3.6 million in Yuma, versus $4.5 million in El Cajon and $4.2 million in San Bernardino (**Figure 3**). This is significant since payroll makes up about half of total annual operating costs.

FIGURE 3
WORKFORCE ASSUMPTIONS AND TYPICAL WAGES
ADVANCED MANUFACTURING

			Annual Wages		
SOC Code	Occupation Title	Employees	Yuma, AZ	El Cajon, CA	San Bernardino, CA
51-2098	Team assemblers	25	$25,553	$37,231	$30,920
51-2028	Electrical and electronic equipment assemblers	10	$28,915	$37,436	$37,538
51-4072	Molding, coremaking, and casting machine setters	10	$32,424	$38,346	$37,221
51-9061	Inspectors, testers, sorters, samplers, and weighers	8	$33,693	$48,145	$41,609
53-7062	Laborers and freight, stock, and material movers	8	$26,780	$32,083	$33,131
51-4021	Extruding and drawing machine setters, operators	7	$30,678	$32,127	$33,733
51-4041	Machinists	6	$44,146	$45,761	$43,839
51-4121	Welders, cutters, solderers, and brazers	6	$37,198	$50,231	$41,496
51-1011	First-line supervisors of production workers	5	$49,829	$72,171	$65,921
17-2112	Industrial engineers	4	$84,996	$99,320	$83,855
17-2141	Mechanical engineers	4	$90,086	$98,139	$88,820
51-4031	Cutting, punching and press machine operators	4	$33,394	$39,798	$39,543
43-5071	Shipping, receiving, and traffic clerks	3	$34,607	$35,952	$37,745
	Total Annual Payroll	**100**	**$3,625,683**	**$4,548,999**	**$4,158,363**

Source: Arizona Office of Economic Opportunity, 2018 Occupational Employment and Wage Estimates; California Employment Development Department, OES Employment and Wages 1Q 2019.

The differences in wage rates not only impact payroll costs, but also have an impact on benefit costs. Total annual benefit costs are estimated at $834,000 per year in Yuma, or 23 percent of payroll versus $1.0 million per year in El Cajon and San Bernardino (**Figure 4**).

Benefits shown here include Social Security and Medicare, which are estimated at 7.65 percent of payroll. Health insurance costs represent state averages for the employer portion of the annual premium for employees enrolled in employer-based health plans. Health insurance costs are based on data from the Kaiser Foundation.

Benefits also include unemployment insurance. In both Arizona and California, unemployment insurance applies to the first $7,000 of payroll per employee. Rates vary depending on individual employer experience. For the purpose of this analysis, a new employer rate of 2.0 percent is applied in Arizona and 3.4 percent in California, using rates collected by the U.S. Department of Labor.

Worker's compensation rates vary by occupation, but an average manufacturing rate of 4.22 percent of payroll is applied for California and 2.02 percent for Arizona. These rates are based on survey information collected by the Oregon Department of Consumer and Business Services. California typically has some of the highest worker's compensation rates in the country.

FIGURE 4
PAYROLL TAXES AND BENEFITS

Assumptions: Unemployment insurance is based on the new employer rate: California 3.4% of first $7,000 of wages, Arizona 2% of first $7,000 of wages. Workers compensation is calculated as a percent of payroll: California 4.22%, Arizona 2.02%.

Yuma, AZ	**$834,004**
Social Security and Medicare	$277,365
Health Insurance[1]	$469,400
Unemployment Insurance	$14,000
Worker's Compensation	$73,239
El Cajon, CA	**$1,049,966**
Social Security and Medicare	$347,998
Health Insurance[1]	$486,200
Unemployment Insurance	$23,800
Worker's Compensation	$191,968
San Bernardino, CA	**$1,003,598**
Social Security and Medicare	$318,115
Health Insurance[1]	$486,200
Unemployment Insurance	$23,800
Worker's Compensation	$175,483

Source: Kaiser Foundation State Health Facts, 2017 data; U.S. Department of Labor, Significant Provisions of State Unemployment Insurance Laws, January 2019; Oregon Department of Consumer and Business Services, Worker's Compensation Premium Rate Ranking Study, 2018 - typical premium rates for manufacturers.

[1] Average annual single premium (employer portion) per enrolled employee for employer-based health insurance.

Utilities

The advanced manufacturing facility in this analysis is assumed to have monthly electricity consumption of 150,000 kWh and a 65 percent load factor, or 320 kW demand per month. Total electricity costs are estimated at $163,000 per year in Yuma versus $265,000 per year in El Cajon and $193,000 per year in San Bernardino (**Figure 5**). These rates reflect time-of-use discounts. Electric utility costs at investor-owned utilities throughout California tend to be significantly higher than in Arizona.

FIGURE 5
ANNUAL UTILITY COSTS

Assumptions: 150,000 kWh/month, 320 kW/month (65% Load Factor)	
Yuma, AZ (APS)	$163,372
El Cajon, CA (SDG&E)	$264,906
San Bernardino, CA (SoCal Edison)	$192,735

Source: Arizona Public Service Rate Schedule E-32; San Diego Gas & Electric Schedule TOU-A; Southern California Edison Schedule TOU-GS-1.

Sales Taxes

Sales taxes can potentially apply to the purchase of machinery, utilities and construction materials. In Arizona, manufacturing equipment is exempt from sales tax, which saves the company an estimated $631,000 on a $7.5 million equipment purchase. In California, manufacturing equipment is only exempt from the 3.9375 percent state tax, resulting in a savings of only $295,000. Utilities are not subject to sales tax in California and the City of El Cajon does not impose a local utility user tax, although there is a 7.75% utility tax in San Bernardino. Electricity is subject to state and local sales tax in Arizona.

The total state and local sales tax rate is 8.412 percent in Yuma and 8.25 percent in El Cajon and 8.00 percent in San Bernardino. Total sales and utility taxes over 10 years are estimated at $609,000 in Yuma versus $905,000 in El Cajon and $1.0 million in San Bernardino (**Figure 6**).

FIGURE 6
LOCAL SALES TAX COMPARISON

Assumptions: Sales and use tax calculation includes purchases of machinery, utilities and construction materials. Exemptions and tax rates vary by state. Analysis assumes 65% of construction cost is materials. Construction costs vary by location. Note that manufacturing equipment is exempt from all sales tax in Arizona and exempt from state sales tax (3.9375%) in California. Electricity, water and sewer are exempt from sales tax in California and no utility user taxes apply in the City of El Cajon.

	Yuma, AZ	8.412% effective state & local tax rate									
	Total	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
no abatement	**$1,239,445**	$1,115,759	$13,743	$13,743	$13,743	$13,743	$13,743	$13,743	$13,743	$13,743	$13,743
Mfg Exemptions	**($630,900)**	($630,900)	$0	$0	$0	$0	$0	$0	$0	$0	$0
Net Tax Due	**$608,545**	$484,859	$13,743	$13,743	$13,743	$13,743	$13,743	$13,743	$13,743	$13,743	$13,743

	El Cajon, CA	8.250% effective state & local tax rate 0.00% local utility user tax									
	Total	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
no abatement	**$1,200,721**	$1,200,721	$0	$0	$0	$0	$0	$0	$0	$0	$0
Mfg Exemptions	**($295,313)**	($295,313)	$0	$0	$0	$0	$0	$0	$0	$0	$0
Net Tax Due	**$905,409**	$905,409	$0	$0	$0	$0	$0	$0	$0	$0	$0

	San Bernardino, CA	8.000% effective state & local tax rate 7.75% local utility user tax									
	Total	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
no abatement	**$1,298,768**	$1,164,336	$14,937	$14,937	$14,937	$14,937	$14,937	$14,937	$14,937	$14,937	$14,937
Mfg Exemptions	**($295,313)**	($295,313)	$0	$0	$0	$0	$0	$0	$0	$0	$0
Net Tax Due	**$1,003,456**	$869,023	$14,937	$14,937	$14,937	$14,937	$14,937	$14,937	$14,937	$14,937	$14,937

Property Taxes

Property taxes apply to real and personal property in both states. In this analysis, the value of the land and building are multiplied by 80 percent to approximate assessed value in California, and by 70 percent in Arizona to approximately limited property value. For personal property, the $7.5 million of equipment is depreciated based on a 10-year schedule that would apply to manufacturing equipment in each state. In Arizona, accelerated depreciation is automatically applied, which would result in a tax savings of $319,000 over the first five years, largely off-setting the difference in property tax rates.

The total effective property tax rate is approximately 2.5 percent in Yuma, 1.2 percent in El Cajon and 1.3 percent in San Bernardino. Real and personal property taxes are relatively similar at $2.3 million over 10 years in Yuma versus $2.0 million in El Cajon and $1.9 million in San Bernardino (**Figure 7**).

FIGURE 7
PROPERTY TAX COMPARISON

Assumptions: Value of New Machinery: $7.5 million; facility value varies by location. Machinery and equipment is depreciated on a 10 year schedule. Real property has not been depreciated in this example. No replacement equipment purchases are assumed. Effective Tax Rates: Yuma 2.51%, El Cajon 1.22%, San Bernardino 1.29%.

Yuma, AZ

	Total	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Real Property	$1,726,258	$172,626	$172,626	$172,626	$172,626	$172,626	$172,626	$172,626	$172,626	$172,626	$172,626
Personal Property	$878,586	$171,118	$154,447	$134,122	$115,660	$97,225	$78,816	$60,436	$42,086	$20,110	$4,566
Accelerated Depreciation	($319,057)	($128,338)	($91,124)	($57,672)	($31,228)	($10,695)	$0	$0	$0	$0	$0
Net Tax Due	$2,285,786	$215,405	$235,949	$249,075	$257,058	$259,156	$251,442	$233,062	$214,712	$192,736	$177,192

El Cajon, CA

	Total	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Real Property	$1,502,865	$150,286	$150,286	$150,286	$150,286	$150,286	$150,286	$150,286	$150,286	$150,286	$150,286
Personal Property	$506,062	$83,187	$77,209	$70,069	$61,431	$53,295	$45,972	$38,504	$31,172	$25,596	$19,627
Total	$2,008,926	$233,474	$227,495	$220,356	$211,717	$203,581	$196,259	$188,790	$181,459	$175,883	$169,913

San Bernardino, CA

	Total	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Real Property	$1,338,163	$133,816	$133,816	$133,816	$133,816	$133,816	$133,816	$133,816	$133,816	$133,816	$133,816
Personal Property	$535,930	$88,097	$81,766	$74,205	$65,056	$56,440	$48,686	$40,776	$33,012	$27,107	$20,785
Total	$1,874,093	$221,913	$215,582	$208,021	$198,873	$190,256	$182,502	$174,593	$166,828	$160,923	$154,601

Summary of Results

Yuma offers a significantly lower cost location for advanced manufacturing than competitive locations in Southern California. Over a ten-year period, the cost of a location in Yuma would be about $10.7 million less than a location in San Bernardino and $18.5 million less than a location in the San Diego metro area (represented by El Cajon) (**Figure 8**). Payroll accounts for about 50 percent of total operating costs in all three locations and the occupational wages for advanced manufacturing in Yuma average about 13 to 25 percent less than those in Southern California. The combination of a lower wage base and lower payroll tax rates also results in payroll taxes and benefits that are 20 to 26 percent less in Yuma. Finally, there are significant advantages to a location in Yuma based on real estate costs due to both lower land costs and lower construction costs.

FIGURE 8
SUMMARY OF COMPARATIVE OPERATING COSTS FOR ADVANCED MANUFACTURING

	Yuma, AZ	El Cajon, CA	San Bernardino, CA
Operating Costs - 10 Year Total	**$67,294,561**	**$85,805,683**	**$78,009,834**
Payroll	$36,256,826	$45,489,990	$41,583,630
Payroll Taxes and Benefits	$8,340,035	$10,499,662	$10,035,977
Equipment Costs	$7,500,000	$7,500,000	$7,500,000
Land and Facility Construction*	$10,669,648	$16,752,637	$14,085,329
Electric Utilities	$1,633,721	$2,649,060	$1,927,349
Local Property & Sales Taxes	$2,894,331	$2,914,335	$2,877,549

*Facility cost represents 10 years of annual payments on commercial real estate loan.

APPENDIX A
MAP OF YUMA AND COMPARATIVE SOUTHERN CALIFORNIA LOCATIONS